



Action on Data and ARS Systems Approach

KIM COOK, NATIONAL PROGRAM LEADER FOOD SAFETY

USDA AGRICULTURAL RESEARCH SERVICE

ARS Science Solutions for AMR

Non-regulatory, intramural research arm of USDA

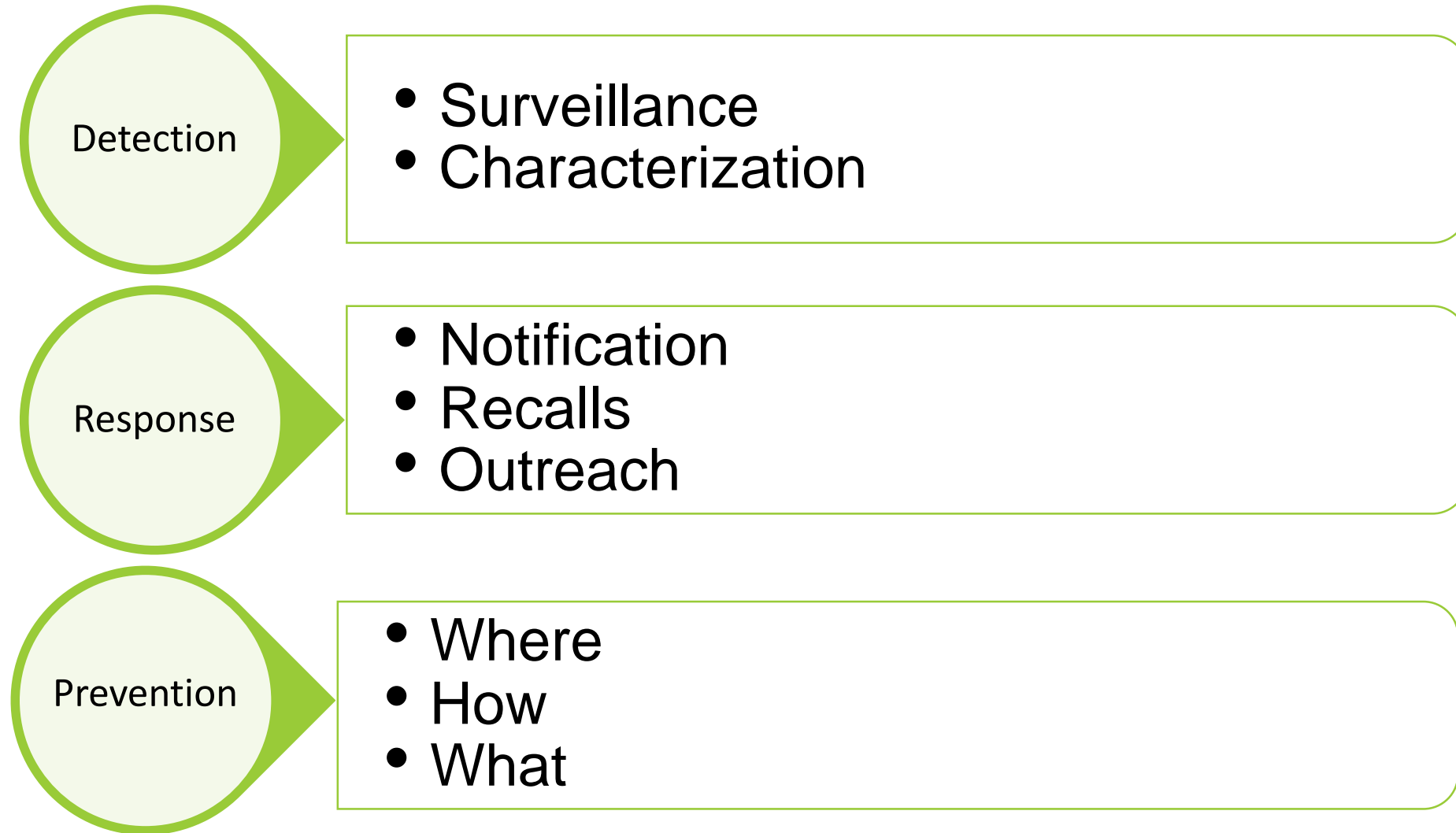
Solution oriented, hypothesis-driven research that delivers solutions to agricultural issues of national priority

Vision: Be the global leader for innovative, equitable, sustainable, scientific research solutions for AMR in agriculture

Mission: To promote the resilience of agriculture to AMR for the health and safety of animals, plants, environment and the U.S. public through cutting-edge research solutions and outreach



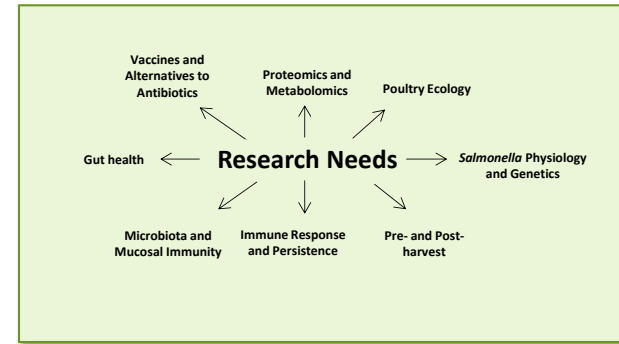
One Health Approach: ARS Focus on AMR Science Solutions



Translating Surveillance into Solutions

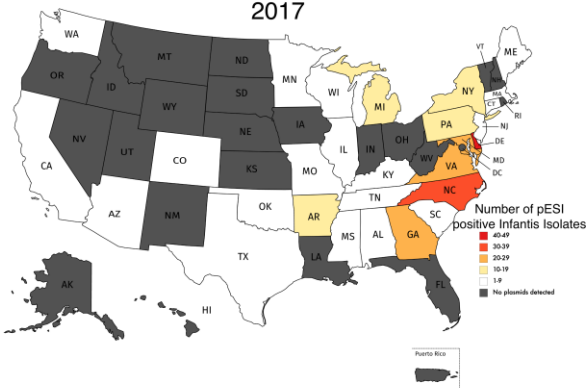


RESEARCH SOLUTIONS FOR *SALMONELLA* INFANTIS
 Meeting of the ARS Salmonella Infantis Working Group, the National Chicken Council, and the National Turkey Federation

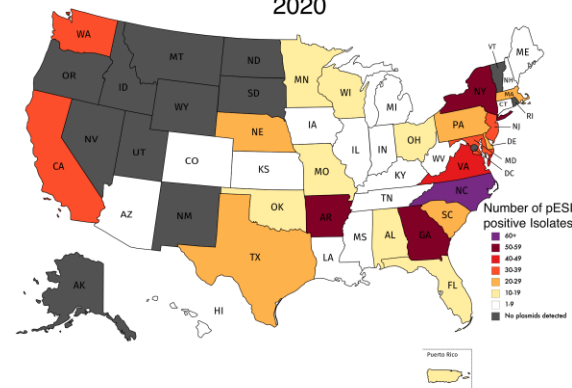


Total Number of *S. Infantis* with pESI Plasmid

2017



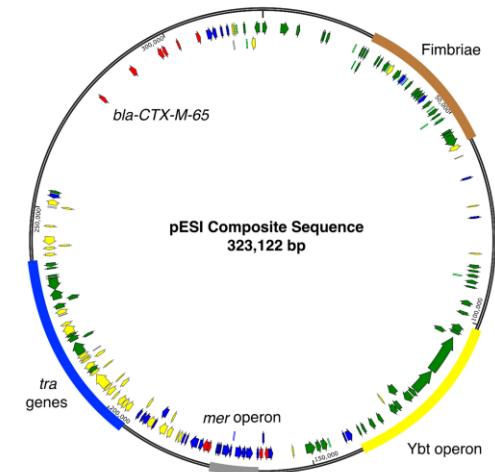
2020



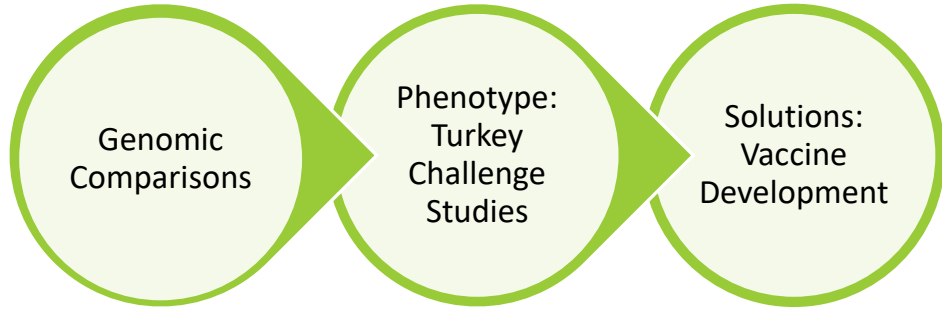
S. Infantis pESI Plasmid Phenotype and Genotype

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| A | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| B | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| C | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| D | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| E | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| F | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| G | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| H | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Biocide Resistance Assay



Holistic Approach

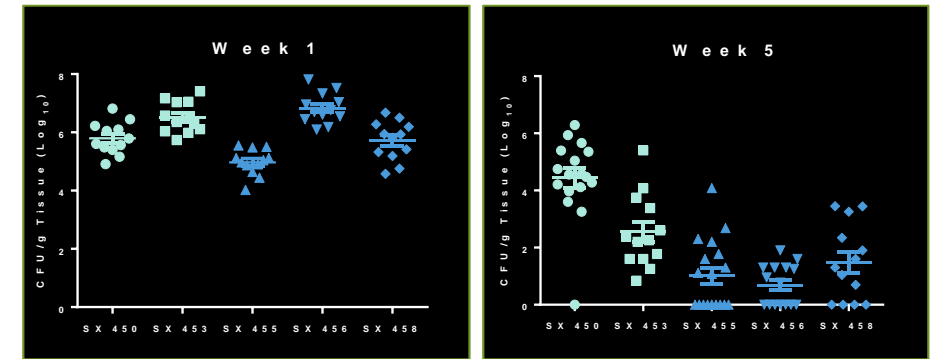
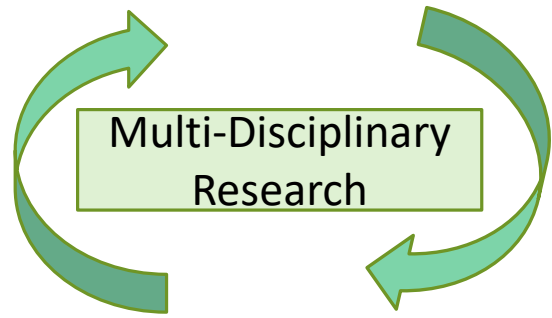
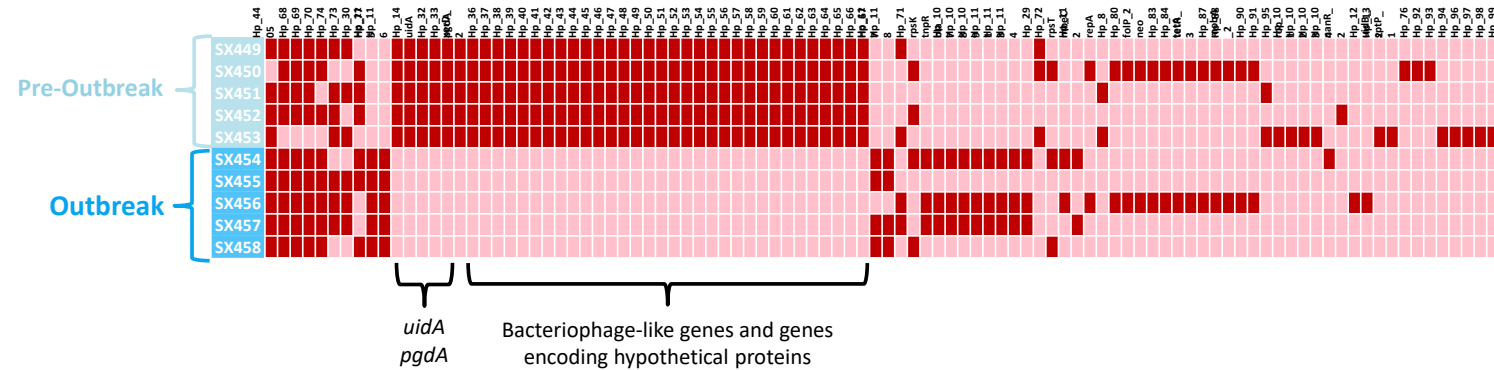


Salmonella Typhimurium BBS 866 live vaccine

- Attenuated in pigs & turkeys
- Differentiation of infected from vaccinated animals (DIVA)
- Cross-protective against wild-type challenge
- Heidelberg (turkeys) and Choleraesuis (pigs)

U.S. patents were issued for the vaccine in 2018 & 2019

Genome Sequence Comparison of *S. Reading* isolates: Gene **Presence** vs **Absence**



Turkey challenge study to evaluate colonization, dissemination and persistence



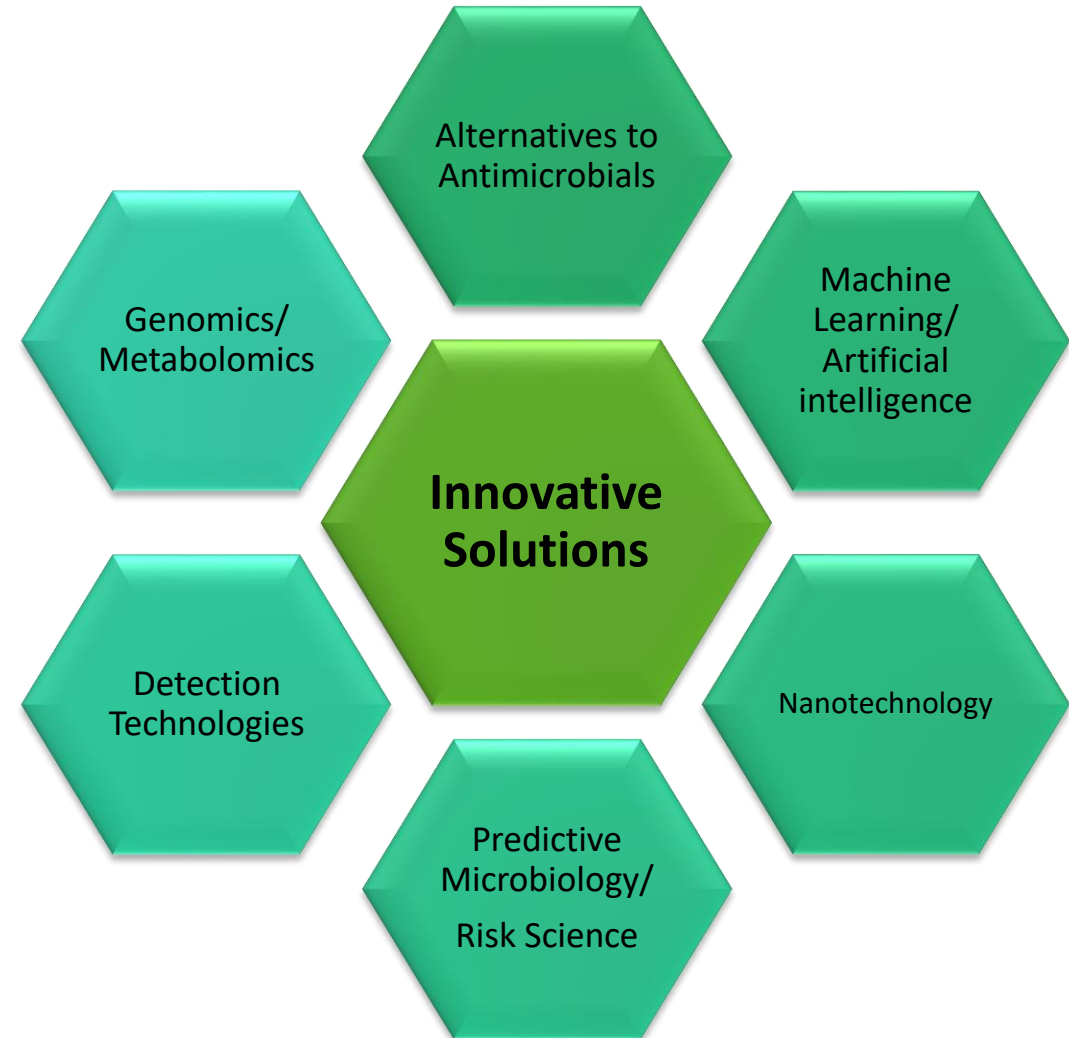
No One Size Fits All Approach for Solutions to AMR

- Iterative multi-hurdle approaches
- Integrated multidisciplinary research
- Innovative strategies
- Intervention focused



Innovative, Equitable, Sustainable AMR Solutions

- Promote resilience in agriculture to AMR
- Provide science-based recommendations
- Design equitable, holistic solutions



Contact

Feel free to contact us for more information:

Kim Cook (kim.cook@usda.gov)

Roxann Motroni
(Roxann.Motroni@usda.gov)

